

Amendments to the claims

The following listing of claims replaces all prior versions and listings of claims in the application.

1. (Currently amended) A ~~Emulgator-free~~ microgel dispersion, obtainable obtained by intermolecular or intramolecular crosslinking in an aqueous medium of a pre-polymer, wherein the pre-polymer has at least two capped NCO groups and at least three groups having at least one active hydrogen atom bonded to a nitrogen atom; or at least three capped NCO groups and at least two groups having at least one active hydrogen atom bonded to a nitrogen atom; at least one segment in the backbone of the polyester originating from a triol, polyol, linear, ~~and/or~~ branched polyester polyol; and at least one group capable of forming anions, wherein in the intermolecular or intramolecular crosslinking the nitrogen atoms carrying at least one active hydrogen atom react with the blocked NCO groups while forming urea compounds and releasing the blocking agent; and the microgel dispersion is emulgator-free.

2. (Canceled)

3. (Previously presented) Microgel dispersion according to claim 1, wherein more than 70% of the groups with at least one active hydrogen atom bonded to a nitrogen atom are reacted while forming polyurea compounds.

4. (Previously presented) Microgel dispersion according to claim 1, wherein the group having at least one hydrogen atom bonded to a nitrogen atom is an NH<sub>2</sub> group.

5. (Previously presented) Microgel dispersion according to claim 1, wherein the pre-polymer has a number-average molecular weight of more than 2,000; an acid number

between 10 and 30 mg KOH/g; at least one segment originating from a diisocyanate as the hard segment.

6. (Previously presented) Microgel dispersion according to claim 1, wherein the triol has 3 to 24 carbon atoms and is preferably trimethylolpropane.

7. (Previously presented) Microgel dispersion according to claim 1, wherein the polyol has 3 to 12 carbon atoms and is preferably di-trimethylolpropane.

8. (Previously presented) Microgel dispersion according to claim 1, wherein the linear and/or branched polyester polyol can be obtained from the polycondensation of a polycarboxylic acid having at least one diol or polyol.

9. (Original) Microgel dispersion according to claim 8, wherein the linear or branched polyester polyol has a number-average molecular weight between 300 and 4,000 and a hydroxyl number between 28 and 580.

10. (Currently amended) Microgel dispersion according to claim 1, wherein the capped NCO groups are the same or different and result from the reaction of a diisocyanate ~~such as~~ selected from the group consisting of 1,1-methylenebis(4-isocyanatocyclohexane) (4,4'-dicyclohexylmethane diisocyanate, Desmodur W), hexamethylene diisocyanate (HMDI, 1,6-diisocyanate hexane, Desmodur H), isophorondiisocyanate IPDI, 3,5,5-tri-methyl-1-isocyanato-3-isocyanatomethylcyclohexane), 1,4-cyclohexyldiisocyanate (CHDI, trans,-trans-1,4-diisocyanato-cyclohexane), ~~in particular and~~ 1,3-bis(1-isocyanato-1-methylethyl)benzene (TMXDI, m-tetramethylylylenediisocyanate), with a capping agent, ~~in particular with methylethylketoxime.~~

11. (Previously presented) Microgel dispersion according to claim 1, wherein the group capable of forming anions originates from dimethylpropionic acid, 9,10-dihydroxystearic acid and/or from a polyester polyol having at least one group capable of forming anions.

12. (Previously presented) Microgel dispersion according to claim 1, wherein the number-average molecular weight of the pre-polymer is at the most 10,000, preferably between 3,000 and 7,000.

13. (Previously presented) Microgel dispersion according to claim 1, wherein the crosslinking is carried out in the presence of an additional polymer with an OH number between 30 and 400 and an acid number between 1 and 150, selected from the group of polyacrylates, polyesters and polyurethanes.

14. (Currently amended) Microgel dispersion according to claim 1, wherein the crosslinking is carried out together with an emulsion polymerization, using  
at least one monomer compound which contains at least one radically polymerizable double bond, and  
at least one monomer compound ~~containing~~ containing hydroxyl groups ~~which contains and~~ at least one radically polymerizable double bond.

15. (Currently amended) Microgel dispersion according to claim 1, wherein the reaction mixture originating from the crosslinking subsequently undergoes emulsion polymerization of at least one monomer compound which contains at least one radically polymerizable double bond and ~~in particular has~~ at least one hydroxyl group.

16. (Original) Microgel dispersion according to claim 14 or 15, wherein emulsion polymerization is carried out in the presence of additionally at least one monomer compound without hydroxyl groups which contains at least one radically polymerizable double bond.

17. (Currently amended) A Emulgator-free microgel dispersion, obtainable obtained by crosslinking of a polymer A and a polymer B, wherein polymer A, dispersed in an aqueous medium with polymer B, has at least two capped NCO groups and polymer B has at least three groups having at least one active hydrogen atom bonded to a nitrogen atom; polymer A, dispersed in an aqueous medium with polymer B, has at least three capped NCO groups and polymer B has at least two groups having at least one active hydrogen atom bonded to a nitrogen atom; polymer A, dispersed in an aqueous medium with a polyamine, has at least two capped NCO groups and the polyamine has at least three groups having at least one active hydrogen atom bonded to a nitrogen atom; or polymer A, dispersed in an aqueous medium with a polyamine, has at least three capped NCO groups and the polyamine has at least two groups having at least one active hydrogen atom bonded to a nitrogen atom; wherein the polymer A and/or polymer B and the polyamine each have at least one segment in the backbone of the polyester originating from a diol, polyol, polyether and/or a polyester polyol, and at least one group capable of forming anions, wherein during crosslinking the nitrogen atoms carrying at least one active hydrogen atom react with the blocked NCO groups while forming urea compounds and releasing the blocking agent; and the microgel dispersion is emulgator-free.

18-20 (Canceled)

21. (Previously presented) Microgel dispersion according to claim 17, wherein the number-average molecular weight of polymer A and/or polymer B is at most 10,000, preferably between 2,000 and 8,000.

22. (Previously presented) Microgel dispersion according to claim 17, wherein polymer A additionally contains two non-capped NCO groups and polymer A undergoes chain elongation/extension before crosslinking with polymer B or the polyamine, with a diamine and/or polyamine.

23. (Original) Microgel dispersion according to claim 22, wherein the diamine or polyamine has at least one group capable of forming anions.

24. (Original) Microgel dispersion according to claim 23, wherein the group capable of forming anions originates exclusively from the diamine or polyamine.

25. (Original) Microgel dispersion according to claim 24, wherein the group capable of forming anions is a sulphonic acid group.

26. (Original) Emulgator-free microgel dispersion according to claim 25, wherein at least one group capable of forming anions is present per 8,000 number-average mole weight units.

27. (Currently amended) A Emulgator-free microgel dispersion, obtainable obtained by crosslinking of a polymer B with a capped polyisocyanate, wherein the capped isocyanate is not dispersible in water and has at least two capped NCO groups; polymer B, dispersed in an aqueous medium, has at least three groups having at least one active hydrogen atom bonded to a nitrogen atom; or the polymer B, dispersed in an aqueous medium with a polyamine, has at least two groups having at least one active hydrogen atom bonded to a nitrogen atom; wherein polymer B has at least one segment in the backbone of the polyester originating from a diol, polyol, polyether and/or a polyester polyol, and at least one group capable of forming anions wherein during crosslinking the nitrogen atoms carrying at least one active hydrogen atom react with the blocked NCO groups while forming urea compounds and releasing the blocking agent; and the microgel

dispersion is emulgator-free.

28. (Canceled)

29. (Previously presented) Microgel dispersion according to claim 27, wherein an additional polymer C with an OH number between 30 and 400 and an acid number between 1 and 150 is crosslinked, selected from the group of polyacrylates, polyesters and polyurethanes.

30. (Previously presented) Microgel dispersion according to claim 27, wherein the crosslinking is carried out together with an emulsion polymerization of at least one monomer compound containing hydroxyl groups which contains at least one radically polymerizable double bond.

31. (Currently amended) Microgel dispersion according to claim 27, wherein the reaction mixture originating from the crosslinking subsequently undergoes emulsion polymerization of at least one monomer compound which contains at least one radically polymerizable double bond and ~~in particular~~ at least one hydroxyl group.

32. (Original) Microgel dispersion according to claim 30 or 31, wherein the emulsion polymerization is carried out in the presence additionally of at least one monomer compound without hydroxyl groups which contains at least one radically polymerizable double bond.

33. (Previously presented) Microgel dispersion according to claim 27, wherein polymer A and/or B has a number-average molecular weight of more than 800; an acid number between 10 and 70 mg KOH/g.

34. (Currently amended) Microgel dispersion according to claim 27, wherein the diol or polyol has 2 to 36 carbon atoms and is preferably selected from the group of trimethylolpropanemonoallyether, di-trimethylolpropane and hydroxylated fatty acid compounds.

35. (Previously presented) Microgel dispersion according to claim 27, wherein the polyester polyol has a number-average molecular weight between 200 and 6,000, an OH number between 20 and 550 and an acid number less than 5.

36. (Previously presented) Microgel dispersion according to claim 27, wherein the group capable of forming anions originates from dimethylolpropionic acid and/or 9,10-dihydroxystearic acid.

37. (Previously presented) Microgel dispersion according to claim 27, wherein the group capable of forming anions originates from a polyester polyol which has at least one free carboxyl group on average per molecule which originates from trimellithic acid, trimellithic acid anhydride, dimethylolpropionic acid or dihydroxystearic acid.

38. (Currently amended) Microgel dispersion according to claim 27, wherein at least one of the groups of the polymer with at least one active hydrogen atom bonded to a nitrogen atom originates from a di- or polyamine, in particular from 2-methyldiaminopentane, ethylenediamine, N,N-diethylenetriamine, adipic acid bishydrazide or hydrazine segment.

39. (Currently amended) Microgel dispersion according to claim 27, wherein the capped NCO groups are different or the same and originate from the reaction of a diisocyanate such as selected from the group consisting of TMXDI (m-tetramethylxylylenediisocyanate), 1,1-methylenebis(4-isocyanatocyclohexane), (4,4'-dicyclohexylmethanediisocyanate, Desdomur W), hexamethylenediisocyanate (HMDI,

1,6-diisocyanatohexane, Desmodur H), isophorondiisocyanate (IPDI, 3,5,5-trimethyl-1-isocyanato-3-isocyanatomethylcyclohexane), and 1,4-cyclohexyldiisocyanate (CHDI, trans-, trans-1,4-diisocyanatocyclohexane) ~~[[and]]~~ or form aliphatic triisocyanates ~~such as selected from the group consisting of~~ N-isocyanatohexylaminocarbonyl-N,N'-bis(isocyanatohexyl)urea (Desmodur N), 2,4,6-trioxo-1,3,5-tris(6-isocyanatohexyl)hexahydro-1,3,5-triazine (Desmodur N3300), and 2,4,6-trioxo-1,3,5-(5-isocyanato-1,3,3-trimethylcyclohexylmethyl)hexahydro-1,3,5-triazine (Desmodur Z4370) with a capping agent, ~~in particular with methylethylketoxime.~~

40. (Currently amended) ~~An Emulgator-free~~ and acrylate-modified microgel dispersion, ~~obtainable~~ obtained by emulsion polymerization of at least one monomer compound (A) containing hydroxyl groups which contains at least one radically polymerizable double bond in the presence of an aqueous dispersion of a polymer (B), the latter containing at least two capped NCO groups; at least one segment in the backbone of the pre-polymer originating from a diol, polyol, polyether and/or polyester polyol; and at least one group capable of forming anions, wherein during emulsion polymerization the hydroxyl groups of the monomer compound (A) react with the capped NCO groups of polymer (B) while forming urea compounds and releasing the blocking agent; and the microgel dispersion is emulgator-free.

41. (Previously presented) Microgel dispersion according to claim 40, wherein the emulsion polymerization is carried out additionally in the presence of at least one monomer compound (C) free of hydroxyl groups which contains at least one radically polymerizable double bond.

42. (Previously presented) Microgel dispersion according to claim 40, wherein the emulsion polymerization is carried out in the presence of an additional polymer (D) with an OH number between 30 and 400 and an acid number between 1 and 150, selected from the group of polyacrylates, polyesters and polyurethanes.



43. (Currently amended) Microgel dispersion according to claim 40, wherein the reaction mixture originating from the emulsion polymerization undergoes further emulsion polymerization with at least one monomer compound which contains at last one radically polymerizable double bond and ~~in particular has~~ at least one hydroxyl group.

44. (Previously presented) Microgel dispersion according to claim 40, wherein the additional emulsion polymerization is carried out in the presence of at least one monomer compound without hydroxyl groups, which contains at least one radically polymerizable double bond.

45. (Previously presented) Microgel dispersion according to claim 40, wherein polymer (B) has a number-average molecular weight of more than 800; and an acid number between 20 and 150 mg KOH/g.

46. (Previously presented) Microgel dispersion according to claim 40, wherein the diol or polyol has 2 to 36 carbon atoms and is preferably selected from the group of trimethylolpropane monoallylether, di-trimethylolpropane and hydroxylated fatty acid compounds.

47. (Previously presented) Microgel dispersion according to claim 40, wherein the polyester polyol has a number-average molecular weight between 200 and 6,000, an OH number between 20 and 550 and an acid number less than 5.

48. (Previously presented) Microgel dispersion according to claim 40, wherein the groupo capable of forming anions originates from dimethylolpropionic acid and/or 9,10-dihydroxyl stearic acid.

49. (Previously presented) Microgel dispersion according to claim 40, wherein the group capable of forming anions originates from a polyester polyol which has at least one free carboxyl group on average per molecule which originates from trimellithic acid, trimellithic acid anhydride, dimethylolpropionic acid or dihydroxystearic acid.

50. (Currently amended) Microgel dispersion according to claim 40, wherein the capped NCO groups are the same or different and originate from the reaction of a diisocyanate ~~such as~~ selected from the group consisting of TMXDI (m-tetramethylxylylenediisocyanate), 1,1-methylenebis(4-isocyanatocyclohexane), 4,4'-dicyclomethanediisocyanate, Desmodur W), hexamethylenediisocyanate (HMDI, 1,6-diisocyanatohexane, Desmodur H), isophorondiisocyanate (IPDI, 3,5,5-trimethyl-1-isocyanato-3-isocyanatomethylcyclohexane), and 1,4-cyclohexyldiisocyanate (CHDI, trans,trans-1,4-diisocyanatocyclohexane) ~~[[and/]]~~ or from aliphatic triisocyanates ~~such as~~ selected from the group consisting of N-isocyanatohexylaminocarbonyl-N,N-bis-(isocyanatohexyl)urea (Desmodur N), 2,4,6-trioxo-1,3,5-tris(6-isocyanatohexyl)-hexahydro-1,3,5-triazine (Desmodur N3300), and 2,4,6-trioxo-1,3,5-tris(5-isocyanato-1,3,3-trimethylcyclohexymethyl)hexahydro-1,3,5-triazine (Desmodur Z4370) with a capping agent, ~~in particular with methylethylketoxime.~~

51. (Previously presented) Microgel dispersion according to claim 40, wherein the number-average molecular weight of polymer (B) is at the most 10,000, preferably between 1,000 and 8,000.

52. (Currently amended) Microgel dispersion according to claim 40, wherein the microgel has an acid number between 10 and 50 mg KOH/g, ~~in particular between 10 and 30 mg KOH/g.~~

53-55 (Canceled)

56. (Previously presented) Microgel dispersion according to claim 17, wherein an additional polymer C with an OH number between 30 and 400 and an acid number between 1 and 150 is crosslinked, selected from the group of polyacrylates, polyesters and polyurethanes.

57. (Previously presented) Microgel dispersion according to claim 17, wherein the crosslinking is carried out together with an emulsion polymerization of at least one monomer compound containing hydroxyl groups which contains at least one radically polymerizable double bond.

58. (Currently amended) Microgel dispersion according to claim 17, wherein the reaction mixture originating from the crosslinking subsequently ~~undergoes~~ undergoes emulsion polymerization of at least one monomer compound which contains at least one radically polymerizable double bond and ~~in particular~~ at least one hydroxyl group.

59. (Previously presented) Microgel dispersion according to claim 57 or 58, wherein the emulsion polymerization is carried out in the presence additionally of at least one monomer compound without hydroxyl groups which contains at least one radically polymerizable double bond.

60. (Previously presented) Microgel dispersion according to claim 17, wherein polymer A and/or B has a number-average molecular weight of more than 800; an acid number between 10 and 70 mg KOH/g.

61. (Previously presented) Microgel dispersion according to claim 17, wherein the diol or polyol has 2 to 36 carbon atoms and is preferably selected from the group of trimethylolpropanemonoallyether, di-trimethylolpropane and hydroxylated fatty acid compounds.

62. (Previously presented) Microgel dispersion according to claim 17, wherein the polyester polyol has a number-average molecular weight between 200 and 6,000, an OH number between 20 and 550 and an acid number less than 5.

63. (Previously presented) Microgel dispersion according to claim 17, wherein the group capable of forming anions originates from dimethylolpropionic acid and/or 9,10-dihydroxystearic acid.

64. (Previously presented) Microgel dispersion according to claim 17, wherein the group capable of forming anions originates from a polyester polyol which has at least one free carboxyl group on average per molecule which originates from trimellithic acid, trimellithic acid anhydride, dimethylolpropionic acid or dihydroxystearic acid.

65. (Currently amended) Microgel dispersion according to claim 17, wherein at least one of the groups of the polymer with at least one active hydrogen atom bonded to a nitrogen atom originates from a di- or polyamine, ~~in particular from 2-methyldiaminopentane, ethyldiamine, N,N-diethylenetriamine, adipinic acid bishydrazide or hydrazine segment.~~

66. (Currently amended) Microgel dispersion according to claim 17, wherein the capped NCO groups are different or the same and originate from the reaction of a diisocyanate such as selected from the group consisting of TMXDI (m-tetramethylxylylenediisocyanate), 1,1-methylenebis(4-isocyanatocyclohexane), (4,4'-dicyclohexylmethane)diisocyanate, Desdomur W), hexamethylenediisocyanate (HMDI, 1,6-diisocyanatohexane, Desmodur H), isophorondiisocyanate (IPDI, 3,5,5-trimethyl-1-isocyanato-3-isocyanatomethylcyclohexane), and 1,4-cyclohexyldiisocyanate (CHDI, trans-, trans-1,4-diisocyanatocyclohexane) [[and/]] or form aliphatic triisocyanates ~~such as selected from the group consisting of~~ N-isocyanatohexylaminocarbonyl-N,N'-bis(isocyanatohexyl)urea (Desmodur N), 2,4,6-trioxo-1,3,5-tris(6-

Applicant : Horst Muller  
Serial No. : 10/536,964  
Filed : May 31, 2005  
Page : 14 of 17

Attorney Docket No.: 68002-005US1

isocyanatohexyl)hexahydro-1,3,5-triazine (Desmodur N3300), and 2,4,6-trioxo-1,3,5-(5-isocyanato-1,3,3-trimethylcyclohexylmethyl)hexahydro-1,3,5-triazine (Desmodur Z4370) with a capping agent, ~~in particular with methylethylketoxime.~~